USDA

United States
Department of
Agriculture

Forest
Service

Hoosier
National
Forest

Report for the Houston South Project Environmental Assessment

Effects to Transportation

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June 21st 2019

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Resource Impacts or Issues Addressed

This report discloses the direct, indirect, and cumulative effects for the transportation plan for the project. Measures that will be tracked throughout this report are:

- Miles of new road construction
- Miles of reconstruction of system roads
- Miles of roads to be obliterated or decommissioned
- Miles of trail effected by road work

Introduction

Located in southern Indiana, the Forest contains approximately 204,318 acres of National Forest System (NFS) land. The Forest was established by proclamation in 1935 and became a national forest in 1954. The land is located in two ranger districts: Tell City Ranger District and Brownstown Ranger District. There is a "checkerboard" mix of public and private lands within each district boundary.

The Forest road network consists of 2,700 miles of roads that serve southern Indiana and the Forest. Most of these roads are under the jurisdiction of local governments or the State of Indiana. County governments maintain approximately 1,366 miles with the state maintaining 834 miles of all-weather roads that are a part of the Forest road network. The remaining 500 miles of roads are under the Forest Service jurisdiction. (USDA Forest Service 2019)

Within the Houston South Project area, there is an established road system of State, County, Forest Service, and private roads that have developed over the past 125 plus years. Table 1 shows the existing road miles within the project area. The project map shows the location for most of the established roads within the project area. Roads provide access to areas by motorized vehicles; allow for resource management such as timber harvest and wildlife management improvements; provide access to dams; provide access to utility lines; and make access easier for recreational pursuits such as camping, hunting, hiking, mountain biking, and horseback riding. At the same time, roads reduce solitude by their use, increase potential for sedimentation, reduce canopy cover, possibly increase effects of fragmentation on the forest, and take land out of use for some resources. Roads also provide for openings for bats, birds, and other wildlife.

The road analysis required examining the entire road system within the project area to determine if new access was needed, if the existing road system was adequate, where improvements were needed to lessen environmental impacts, and if any roads needed to be closed, restricted, or obliterated for resource protection or other reasons (water quality, wildlife, or recreation). To analyze a logical transportation system for removal of the timber a small number of roads or segments of roads may fall outside the project area boundary. Upon field review of the proposed roads to be used for the project it was found that some segments of existing roads were in poor locations as they are on the fall line of the hillside, deeply eroded, crossed private property without an easement, and crossed old home sites. These segments of roads may be re-aligned, have new routes located, or may be planned for obliteration or decommissioning to lessen

environmental impacts of the area, to avoid historic sites or to provide permanent Forest Service access. Refer to each alternative for the roads to be affected.

When a project, such as Houston South, is planned on National Forest System land to which there is inadequate road or trail access, there is a tendency to secure access in the quickest form to meet the immediate needs for that project. This can lead to a shortsighted approach responding only to the immediate needs and not fulfilling the long-term access needs. Under the Houston South project all attempts have been made to secure the appropriate and necessary access for managing the area on a long-term basis for multiple uses. There may be situations where temporary limited authorization or a permanent limited easement may be appropriate to provide the needed access. However, such a determination must be consistent with the applicable Forest Land Management Plan (FLMP), and must be based on an analysis of the future multi-resource transportation and use requirements of the area, including use by the general public. (Craven 2003)

The Hickory Ridge trail system will be impacted by the project's transportation system. Portions of the trail system use system roads which will be reconstructed to accommodate timber harvest activities, provide access to wildlife openings, and provide better access for management of the Forest's land base. Access roads will also need to utilize portions of the trail system to accommodate timber harvest, however; disturbance on the trail system will be kept to a minimum when possible. Restrictions on county roads due to bridge and road weight limits may require changes in how sections of the Houston South area are accessed.

Forest Plan Direction

The overall Houston South project boundary comprises a relatively small portion of the Forest's land base (23,363 acres approximately 11.4% of overall ownership). The maximum treatment area is 13,500 acres (6.5% of overall ownership) for prescribed burning and a maximum of 4,382 acres (2.1% of overall ownership) will receive silvicultural treatment, with the silvicultural treatment area primarily located within the prescribed burn area. The majority of activities proposed would take place in Management Area 2.8 as prescribed in the Forest Plan. Some prescribed fire is proposed in Management Areas 2.4 and 6.4. Management Area 2.8 is general forest with large areas of old forests and scattered openings associated with a variety of forest plant communities. The Forest is generally accessible by trails and a network of roads (USDA 2006). These areas include scattered blocks of NFS land. There is ample evidence of human activities, most of which blends well with the natural environment. Visual quality and recreation opportunities are protected and enhanced. Interaction among visitors is frequent. The transportation system is designed and constructed to safely and comfortably accommodate both specialized recreation vehicles and associated service vehicles. By using proper location, design, and construction methods roads can provide forest users with access to the forest for recreational activities and disperse the users more widely across the forest. (USDA 2006)

Desired Condition

Desired conditions for Hoosier National Forest are described in the *Forest Plan.* The goal of the Forest is to have a road system that provides access for a variety of activities with minimal impacts to the land, to upgrade or obliterate old roads to prevent erosion from occurring, and to

provide access for fire suppression activities. Every area does not need a road, and every road need not be open, but providing accessible areas on the Forest and having a comprehensive transportation network are fundamental. Roads are also needed to provide access for the physically challenged or those otherwise unable to visit areas of the Forest.

In Management Areas 2.8, woody debris resulting from vegetative management and prescribed burning should receive special treatment along the visual foreground of frequently traveled road, trail, and streams to meet the visual quality objective (USDA 2006).

Existing Conditions

There is approximately 88.45 miles of roads within or immediately adjacent to the project boundary. Approximately 16.4 miles are Forest Service system roads. Besides the system roads, there are numerous linear scars from old road corridors used for pond construction, logging, fence line access, old home sites access and other uses within the project boundary. Portions of these old roads may be used for access to the treatment stands. Table 1 is a breakdown of existing road miles and jurisdiction within the project area. Of the 16.4 miles of Forest Service system roads within the project area, 4.11 miles of Forest Service system road were analyzed to be used for access for this project and 2.66 miles are planned to be obliterated or decommissioned.

Data sources include existing classified roads, resource inventories, and personal knowledge of Forest staff. Initial road reconnaissance was started in November 2018 and concluded in May 2019. Roads were identified with Google Earth, Forest GIS, and digital USGS topographic maps for the analysis area.

Table 1: Total existing road miles within the project area

Jurisdiction	Road Miles (%)
Forest Service	16.39 (18.5%)
State	14.42 (16.3%)
County	57.64 (65.2%)
Total	88.45 (100%)

Scope of the Analysis

The spatial boundary used to evaluate **direct and indirect** consequences was the project area because all road-related needs for specific restoration activities fall within this area.
The spatial boundary used to address **cumulative** impacts was both within the project area and expanded outside the project area. The boundary used was selected as it allows for logical routes for timber haul and to provide access if roads within the project area are closed due to planned activities. From the northwest corner of the project boundary the effects boundary approximately follows Jackson County Roads 1100 North, 1070 North, 1250 West, 1025 North

1000 North and 800 West to the Town of Houston, thence continuing east on 975 North, 750 West, 675 West, and 1075 North to State Road 135, thence south on State Road 135 to State Road 58 West. It then follows State Road 58 West to Jackson County Road 1250 West, thence north and west on 1250 West and 650 North to the Jackson/Lawrence County line. It continues west and north on Hickory Grove Road to County Road 1440 West. Thence continuing north into Jackson County again on County Roads 1440 West, west on 925 North, and North on 1460 West and 1500 West.

Although the effects of roads on the landscape will last significantly longer, the initial construction effect is not expected to last beyond the project activities. Thus, reasonably foreseeable future actions will be analyzed from present to 2031, which is the timeframe for the planned silvicultural treatments for this project. National Forest Lands, private lands and other ownership are considered.

Activities in the past 100+ years have had an impact within the project area. It would be almost impossible to track all the activities associated with roads in that time frame. Past actions will be analyzed over the past 30 years.

Methodology

In the late 1990's and early 2000's the Forest attempted to inventory all the roads and road corridors across the Forest. The Houston South project area was included in this inventory. Crews looked at and evaluated the majority of existing road corridors within the project boundary. The roads were mapped using GPS and then the Forest selected which of these roads would be needed to manage the forest. The selected roads were then made a part of the Forest's Transportation System. Although the intent was to map all roads, road corridors and/or linear scars, not all were picked up. Using this GPS data along with old quad maps, aerial photos, Lidar, and walking the project area, the project transportation plan was devised.
Many of the tables within this Transportation Section use road lengths and road segments that were measured in the field by pacing or measuring wheel, by using existing transportation and GIS lengths, and by measuring road segments using Google Map. The proposed temporary and new system roads were located using GPS and/or GIS to plot their location.

Environmental Consequences

The consequences common to all action alternatives for the transportation plan for the area are best described by alternative. In general, action alternatives will improve access to the area, reduce erosion potentials and allow for the obliteration/decommission of roads that are having a detrimental effect on the area.
Within the project area linear scars, or old road corridors, were found throughout. Many of these old roads follow the ridge tops. These linear scars were created from past timber harvesting, wildlife pond construction, wildlife opening maintenance, County road access, and from homesteading of the area to mention a few. These linear scars were also used for portions of the

Hickory Ridge trail system. When planning the transportation system for the project analysis area, these existing linear scars were taken advantage of in order to minimize additional land clearing if environmental constraints could be met. This practice also minimizes soil and watershed impacts. The strategy used in route selection for resource management within the project area was to balance optimized locations with existing access corridors and to have the roads lie lightly on the land. Dual use of Forest Service roads is a common practice on the Hoosier National Forest as all resources share many of the existing corridors for a variety of management practices.

The miles of system roads on the Hoosier can be directly affected by new road construction, obliterating/decommissioning of existing system roads and by the reclassification of non-system roads to system roads and vice versa. Table 2 shows the difference new roads and roads obliterated/decommissioned will have on the overall miles of road within the project area. Not all new roads will be added to the National Forest road system. Road-specific information for new road construction and decommissioning is shown in Tables 7 and 9. Anticipated road construction, reconstruction, and decommissioning costs are shown in Table 3.

Table 2: Overall Change in Project Area Miles by Alternative

Alternative	Existing Miles of FS Roads (1)	Miles of New Construction (2)	Miles Obliterated/ Decommissioned	Total Miles Proposed For Project Area (3)	Mileage Difference (4)
Alternative A	16.39	11.47	2.70	25.16	8.77
Alternative B	16.39	0	0	16.39	0

(1) Miles of Existing National Forest System Roads based on INFRA/Forest GIS
(2) Approximately 8 miles of new road is located within previously disturbed corridors (trails, existing roadbeds, etc.)
(3) Total Miles Proposed = Existing FS Road Miles + Miles of New Construction - Obliteration Miles
(4) Mileage Difference = Total Miles Proposed - Existing FS Road Miles

See Attachment 4 for Existing Transportation System maps

See Attachment 5 for Proposed Transportation System maps

Portions of the Hickory Ridge Multi-Use trail system lie on system roads which will be reconstructed for access on the project. Sections of the trail will also be used for temporary and new system roads. Access on these portions of trail will be affected as the roads, the trail lies on, will be used for harvest activities. Harvesting of the timber may create some inconvenience for users and possible closures of segments of the trails, dispersed campgrounds, and roads. Dust and noise from harvest activities will have a short-term negative effect on recreational and travel experiences.

The action alternative includes construction of new system roads, maintenance and reconstruction of existing system and construction of temporary roads for harvest activities and

wildlife openings. Road construction or reconstruction is designed to provide long term access into areas at the minimum level needed to meet resource and use objectives. Temporary roads are designed to provide a short term access into areas for a single purpose need. Use of and improvements to system roads is necessary to facilitate timber harvest.

Included in the project are several existing system roads and segments of system roads to be decommissioned. These specific roads and segments, shown in Table 9, have been identified as not needed for future management purposes.

Road construction/reconstruction activities that will have an impact on the landscape include, but are not limited to: culvert installations, natural material fords, drainage dip construction, clearing corridors, aggregate placement, and earthwork. Effects from the road work will be short term sedimentation of drainages and movement of some of the earthwork material downhill. By placement of erosion control material and seeding and mulching of disturbed areas these effects can be minimized. It has been found during past construction activities on the Hoosier that the larger sediment in drainages is usually confined within the first 100 feet of the drainage structure with finer material being found as far as 300 yards downstream. It has also been found that disturbed areas will heal themselves within two to three years. Long term effects may include blockage of aquatic organism passage in drainages due to improper culvert installations, taking ground out of production, degradation of drainages due to ford crossings, and movement of aggregate surfacing off the roadway due to routine road maintenance and during heavy rain events.

Roads will be maintained throughout the life of the project and afterwards according to each road designated Maintenance Level and as addressed in the Road Management Objective (RMO) for each road. Temporary culverts should be installed in drainages during right-of-way clearing and road construction to reduce sedimentation entering the drainages.

Environmental Consequences (Effects) by Alternative

Alternative A – Proposed Action

This alternative proposes using a combination of temporary roads and system roads, both existing and new, for harvest activities. New construction under this alternative is to provide long term access to stands for future TSI and other post sale activities. The transportation system for this alternative did not access all stands identified for treatment with system roads. Stands not accessed with system roads under this alternative will either have portions or the entire stand dropped from treatment, have temporary roads, or have increased skidding distances to harvest the timber. During the analysis of the area there was no distinction between what roads will become system roads and which roads will be used only as temporary roads. That decision will be determined during planning for each sale area and will be based on factors such as skidding distance, soil conditions, future access needs, and topography to name a few.

Table 3 shows the proposed road miles and costs associated with this alternative.

Temporary and system roads would provide initial access for prescribed burning within the project area. Temporary roads would not provide access for future planned burns as they are to be obliterated after use or returned to use as an existing trail.

Temporary roads constructed for timber removal under this alternative would be immediately closed and stabilized or obliterated upon completion of the sale. To maintain short term access to portions of the project area for post-sale treatments and other purposes some temporary roads may be left open until project-related work is completed. Of the 16.39 miles of FS system roads within the project area, currently 1.24 miles is open to public motorized vehicle use. The remaining 15.15 miles is blocked by either gates, barrier posts, earthen berms, or has naturally closed. All existing roads being used as a part of this project will be evaluated to see if any can be left open year round or seasonally. New roads will be evaluated to see whether they should be closed. If they are to be closed, gates will likely be used if administrative access is needed in the future (for maintaining trails/wildlife openings/ponds/etc.). Wooden barrier posts may also be used to deter motorized access.

This alternative has a moderate amount of new system road construction and temporary road construction. Due to the miles of reconstruction, road obliteration, and by not accessing all the proposed treatment stands with new roads, this alternative should help reduce resource damage, stream sedimentation, and improve existing road corridors. Historically on the Hoosier, temporary roads have water bars constructed upon completion of use and are then left to the elements. Since these are not system roads little or no maintenance is done on them. Over time the water bars fill in with sediment and on steep grades they normally wash out leading to erosion gullies that carry sediment to drainages. Temporary roads do not allow for long term access for resource and management activities. New roads including temporary roads can provide access for illegal ATV use on the forest.

Access across private lands will be necessary in order to fully implement the proposed transportation plan. In some locations, crossing private land results in a shorter and more desirable haul route. In other locations, due to terrain issues on National Forest system land, crossing private land provides the only apparent haul route. Acquisition of each easement will begin approximately one year prior to the initial timber sale for which each road is needed.

There are no existing disposal sites within the project area that can used for disposal of material associated with ditch cleaning, slumps, road repairs, and other associated road activities. The county currently pushes material off the edge of the roadway on the fill slopes. Disposal sites will be located during the sale prep. Disposal sites are to have no hazardous materials disposed in them. Currently there are no borrow areas within the Houston South project area. Borrow material locations for road construction, if needed, will be determined with each road project.

Table 3: Alternative A Road Miles & Costs

Road Use and Construction for each Area	Number of Miles Affected 1/	Estimated per Mile Road Cost 2/
New Road Construction 3/	11.57	$105,000.00 * $63,000**
Existing Road Reconstruction and Maintenance 4/	4.86	$73,893.00*** $12,378.00****
Road Obliteration or Decommissioning	2.70	$20,148.00 5/

1/All mileage figures are approximate. Not all lengths or roads shown may be used.

2/ Costs based on road costs associated with recent roadway maintenance contract rates. Road costs will be less if constructed under timber sale contracts.

3/ New Road Construction will either be as a system road or temporary road. Actual type of road will be determined during sale layout.

* Estimated new road construction cost. Cost reflects 4" depth of aggregate.
** Estimated temporary construction cost. Cost does not include any aggregate.

4/ Road reconstruction and road maintenance will be determined during sale layout.
***Estimated reconstruction cost. Cost reflects 4" depth of aggregate.
****Estimated maintenance cost under the timber sale. Cost reflects spot aggregate placement.

5/ Decommissioning costs based on 2010 Millcreek road obliteration contract. Work included ripping the roadway, pulling slash onto road, and seeding.

Alternative B – No Action

There would be no change to the current transportation system under this alternative. Current resource problems, road erosion, and sedimentation of drainages will not be addressed. No roads will be decommissioned or obliterated under this alternative. Under this alternative there would be no effects to the trail system due to road construction or reconstruction activities.

Trails and Recreation Areas

Approximately 5.23 of the 48.7 mile long Hickory Ridge Trail System will be directly affected by the proposed transportation plan. There is currently 8.7 miles of existing system roads with trail attached in the project area, of which 2.15 miles will be maintained or reconstructed as a part of this project. 1.35 miles of existing road with trail attached will be decommissioned and returned to trail only status. An additional 3.08 miles of the trail system is planned to be

upgraded to system or temporary roads via new road construction. Table 4 shows the length of trail to be affected under each alternative. Refer to the Recreation section for mitigation measures for the trail portions used.

Since segments of the trail are also part of the transportation system conflicts could arise between users of the trail systems and harvesting activities. Portions of the trails may be interrupted by short-term closures during logging activities. Trail treads on temporary road locations may be rutted and soil displaced by using the trails for hauling activities. Damaged trails can be mitigated by restoring the trails to their pre-harvest condition. Portions of the trail system that lie on system roads will lose the trail characteristics due to road reconstruction work. Slash generated from road work on the trail has been a visual problem in the past and should be chipped or buried under the Houston South project.

Dispersed campsites within the project area may need to be temporarily closed for the safety of the users due to harvesting and hauling.

Table 4: Affected Trail Lengths under Each Alternative

Road Activity	Alternative A	Alternative B
	Affected Trail Miles	Affected Trail Miles
Road Maintenance/ Reconstruction	2.15	0
Road New Construction	3.08*	0
Road Decommissioning	1.35**	0

*The 3.08 miles will either be upgraded and used as a system road or will be used as a temporary road. The actual method will be determined during sale prep.

** Road will revert back to trail only, with no on-the-ground disturbance planned.

Cumulative Effects

The cumulative effects discussion for the Houston South Project assesses the combined effects from past, present, and reasonably foreseeable future actions from activities on Federal and non-Federal land within the cumulative effects area.
Table 5 shows past, present and future activities that fall within, or are adjacent to, the cumulative effects boundary. Although past activities fall outside the Houston South time frame they have a cumulative effect on the project area. Those projects identified as having a cumulative effect with the proposed Houston South Project will be addressed further.

Table 5: Past, Present, and Future Activities

Project	Past, Present, or Future Action	Cumulative Effects Boundary Overlap (Yes/No)	Time Overlap (Yes/No)	Cumulative Effect (Yes/No)
Hickory Ridge Trails/ Reroutes	Past & Present	Yes	Yes	Yes
Timber Harvest Access	Past & Future	Yes	Yes	Yes
Road Obliterations, Decommissioning, and Vacations	Past & Future	Yes	Yes	Yes
Land Acquisitions	Past & Future	Yes	Yes	Yes
Old Homesites Access	Past	Yes	Yes	Yes
County Road maintenance and reconstruction	Past, Present & Future	Yes	Yes	Yes
Private Access Roads	Past, Present & Future	Yes	Yes	Yes
Utility Transmission Line Access	Past, Present & Future	Yes	Yes	Yes
Trail Maintenance	Past, Present & Future	Yes	Yes	Yes
Wildlife Pond/wetlands Access	Past, Present & Future	Yes	Yes	Yes

Hickory Trails/Reroutes: The most recent trail reroute within the project area occurred on Trail 18 in 2014. Future trail reroutes may occur on trails that are located within riparian areas or in poor locations. Trail closures will be necessary in order to implement both silvicultural and prescribed burning treatments.

County Roads: Both Jackson and Lawrence County Highway Departments actively maintain the County roads within the project area. The maintenance work normally consists of installing new and replacement of existing culverts, ditch reconstruction/maintenance, brushing, surface blading, aggregate placement, and hazard tree removal. Road maintenance will continue on existing county roads. The National Forest is currently partnering with Jackson County to replace two concrete low-water crossings with bridges. The bridge located on Jackson County Road 800 North at Starnes Branch is nearing completion, and construction is expected to begin soon at the Negro Creek crossing on Jackson County Road 1250 West (Polk Patch Road).

County Bridge Restrictions: Currently there are several bridge restrictions and closures across the project area, which are labeled on the maps in Attachments 4 and 5. Potential haul routes on County and State Roads within the project vicinity should be examined prior to each sale, as the road conditions and bridge restrictions (weight limits, etc.) are subject to change.

Unmaintained County Road: Jackson County Road 625 North is shown on the 1994 Road Map of Jackson County and is currently shown on the Jackson County GIS website as providing access to National Forest land in Section 11, T6N, R2E. The road is not actively maintained; however, the minutes from the February 19th, 2019 Jackson County Commissioner's meeting clarify that this road is on the County's road inventory. The minutes further clarify that if a home is constructed along this road, then the Highway Department will begin maintaining said road. In the event that the National Forest needs this road prior to Jackson County Highway resuming maintenance on this road, then the road will be reconstructed as a part of this project. See Road R3 on Map 2B for specific road location.

Private Access Roads: Current roads on private lands mostly access home sites, out buildings, ponds, fields, and timbered land. As private lands are broken up, sold, or timber harvested additional roads may be constructed for new home sites, out buildings, or timber access. The effect of any additional roads on private lands would be a higher road density for the area and possible sedimentation of drainages and lakes.

Gas Transmission Line Access: Current access to the transmission lines that bisect the project area is to allow for maintenance activities. Maintenance on the transmission line right-of-way consists of mowing and inspection and should have no effect on the Houston South project. There is minimal, if any, illegal ATV/UTV use within these utility corridors.

Trail Maintenance: Sections of the Hickory Ridge and Fork Ridge Trail Systems lie on top of National Forest System Roads. Within the Hickory Ridge area, seven system roads (4612.080, 4612.090, 4612.205, 4513.080, 4513.086, 4513.087, and 4513.060) are co-located with trails, consisting of 6.85 miles of overlapping road/trail routes. Within the Fork Ridge area, two system roads (4647.010 and 4647.040) are co-located with the Fork Ridge Trail. With the exception of recent road maintenance on FS Road 4647.040 (0.31 miles, MP 0.00 to 0.31), any road maintenance completed on these roads within the last 10 years has been a direct result of trail maintenance.

Other Projects: The continuing land acquisition on the Hoosier could have an effect on the planned transportation system for this project and future projects on the forest. As most of the lands acquired by the forest have existing road systems these could change the proposed access to forest lands. At this time no land acquisitions are being planned within the cumulative effects boundary.

Although private land is located within the effects boundary there are no known projects that would have an effect on the restoration project.

Past Activities

The Forest Service has completed minimal road maintenance work within the project area in recent years, due to a majority of these roads being closed to public motorized use. Most of the road maintenance work has focused on maintaining public motorized vehicle access in the Fork Ridge area (FS Road 4647.020 and FS Road 4647.040) and near Fleetwood Cemetery (FS Road 4511.180). In other locations within the project area, barrier posts have been installed to deter motorized vehicle use on closed roads. Gates have also been installed to allow administrative access for certain roads and trails.

Portions of the project area have been homesteaded, farmed, and logged in the past. Wildlife openings have been created from some of these past practices and are currently being maintained by the FS and the state DNR.

Jackson and Lawrence Counties complete annual road maintenance work on their roads within the project area. Work has included culvert replacements, grading and ditch work, blading, adding aggregate surfacing, and roadside brushing.

Future Activities

Foreseeable future road projects on Federal lands are the construction, reconstruction, and maintenance of system and temporary roads for this project. Continued road maintenance will occur on existing system roads within the project area. Continued trail maintenance will also occur on trail segments that both lie on and off of roads. Reroutes of the Hickory Ridge Trail System are possible in the future. Continued maintenance of wildlife openings is planned in the future.

At this time, I am not aware of any State or County Highway Department projects that would shut roads down for extended periods of time. Routine maintenance of State and County roads is expected to be similar to past maintenance activities.

Consistency with the Forest Plan

Alternative A is consistent with the *Forest Plan.* Alternative A moves the land toward the desired future condition for Management Area 2.8.

Suitability

The majority of the project area is suitable for road construction. Drainages to be crossed are suitable for culvert installations and natural bottom or reinforced fords. Drainage structures, whether existing or proposed, will be evaluated to make sure they meet Aquatic Organism Passage (ORB) requirements. Temporary bridges may be needed for access over drainages in place of culvert installations. Temporary culverts in drainages may be required during removal of right of way timber and during road construction to minimize sedimentation of the drainage.

ATTACHMENT 1

Recommended Design Features and/or Mitigation Measures to Address Transportation Concerns

Table 6: Recommended design features/mitigation to address Transportation Concerns.

	Mitigation	Applicable Alternative	Reason Recommended	Effectiveness Reference
1.	Temporary culverts	Ford drainage crossings	Avoid placing sedimentation in drainage for access for ROW logging and road construction.	
2.	Slash Disposal	Chip or bury slash	To stay within Forest Guidelines dealing with visuals along trails and recreation roads.	
3.	Aquatic Organism Passages (AOP)	Bridges, bottomless pipes, fords	To meet guidelines for AOP crossings on drainages.	
4.	Asphalt Road Surface Breakup	Seasonal haul restrictions	To prevent breakup of asphalt surfaces due to haul/road work during wet times of the year.	
5.	Sediment Movement	Install erosion control devices, keep equipment out of drainages.	To prevent movement of sediment into drainages from construction activities	

ATTACHMENT 2

References

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U.S. Department of Agriculture, Forest Service. 1974. National Forest Landscape Management Handbook 462, Volume 2 Chapter 1. The Visual Management System. Washington, D.C.

U.S. Department of Agriculture, Forest Service. 2006. Land and resource management plan – Hoosier National Forest. Eastern Region, Hoosier National Forest. 85 p.+ appendices.

U.S. Department of Agriculture, Forest Service. 2006. Final Environmental Impact Statement – Hoosier National Forest. Eastern Region, Hoosier National Forest. Chapter 3. 309 p.

U.S. Department of Agriculture, Forest Service. 2009. Soil-Disturbance Field Guide. 103 p.

ATTACHMENT 3

Road Criteria

Shows planned criteria for FS roads to be used within the project area. The road criteria should be used in conjunction with Forest Service Handbook 7709.56, Hoosier National Forest Road Design Guidelines, Indiana field guide for best management practices along with other research papers and publications.

Definitions

Critical vehicle – The vehicle, normally the largest, whose limited use on the road is necessary to complete the planned activity.

Design vehicle – The vehicle frequently using the road.

Road Maintenance Objectives (RMO) – The planned type and frequency of maintenance to be accomplished on system roads.

Surface Type – Type of road surface - native, aggregate, asphalt, or concrete.

Traffic Service Level (TSL) – Describes the road's significant traffic characteristics and operating conditions. Level C is defined as interrupted traffic flow, limited passing facilities, may not accommodate some vehicles, low design speeds, unstable surface under certain traffic or weather.

Minimum Surface Width – Width of road needed to accommodate the design vehicle and for necessary steering corrections and off tracking. Additional widening may be necessary on curves, turnouts, turnarounds, and radii.

Use of Road Duration – Defines the length of time that a road is expected to be needed. Temporary duration indicates that a road is expected to be needed for this project's activities only. Long term duration indicates that other access needs exist, beyond this project, such as access to wildlife openings, ponds, trails, etc.

Table 7: New Road Construction Summary

Project Road Number	Proposed Length (feet)	Beginning Milepost (miles)	Ending Milepost (miles)	Minimum Surface Width (ft)*	Recommended Surface Type	Traffic Service Level	Critical Vehicle Type	Use of Road Duration	Post-Project Closure Method, if applicable	Comments
NR 1	253	0	0.048	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 2	161	0	0.030	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	Provides access to pond
NR 3	138	0	0.026	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 4	200	0	0.038	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 5	185	0	0.035	12	Aggregate	C	Log Truck	Long Term	Barrier posts at east end of road	Keep open for existing dispersed campsite
NR 6	2390	0	0.453	12	Aggregate	C	Log Truck	Long Term	Gate between County Road and WL opening	Provides access to WL opening & pond
	863	0.453	0.616	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	Road east of pond to be closed following use
NR 7	2250	0	0.426	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 8	3009	0	0.570	12	Aggregate	C	Log Truck	Temporary	Gate, Convert back to trail	Existing FS trail
NR 9	902	0	0.171	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	Connects to Road Reconstruction R1
NR 10	274	0	0.052	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 11	1312	0	0.248	12	Aggregate	C	Log Truck	Temporary	Barrier posts or gate, Convert back to trail	Existing FS trail, Connects to Road Reconstruction R2
NR 12	2903	0	0.550	12	Aggregate	C	Log Truck	Long Term	Gate/barrier posts	Provides access to pond, convert to road/trail
NR 13	291	0	0.055	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 14	167	0	0.032	12	Aggregate	C	Log Truck	Long Term	None	Provides better access to dispersed campsite
	1138	0.032	0.247	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash north of FS Road 4613.140	
NR 15	2293	0	0.434	12	Aggregate	C	Log Truck	Long Term	Gate or barrier posts	Provides access to WL opening, pond, private parcel
	3658	0.434	1.127	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash at MP 0.434	Eastern 0.69 miles may not be needed if access across pvt land in Sec 6, T6N, R3E is obtained
NR 16	324	0	0.061	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 17	540	0	0.102	12	Aggregate	C	Log Truck	Long Term	Gate & barrier posts at County Road	Provides access to WL opening & pond, Existing trail
	1481	0.102	0.280	13	Aggregate	C	Log Truck	Temporary	Barrier posts or slash at MP 0.225	0.102 - 0.225 Revert to trail only; 0.225 barrier posts or slash beyond trail
NR 18	3428	0	0.649	12	Aggregate	C	Log Truck	Long Term	Gate & barrier posts northeast of proposed parking area	Create new parking area/turnaround near MP 0.26. Provides access to trail & 3 WL openings
NR 19	1970	0	0.373	12	Aggregate	C	Log Truck	Long Term	Gate and barrier posts near County Road	Provides access to trail system and 3 WL openings
	2216	0.373	0.793	12	Aggregate	C	Log Truck	Temporary	Convert back to trail	
NR 20	268	0	0.051	12	Aggregate	C	Log Truck	Long Term	Gate and barrier posts near County Road	Provides access to WL opening
NR 21	1909	0	0.362	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Temporary bridge required to cross stream
NR 22	691	0	0.131	12	Aggregate	C	Log Truck	Long Term	None, existing road south to remain gated	Provides access to 2 WL openings, Existing FS Trail
	244	0.131	0.177	13	Aggregate	C	Log Truck	Temporary	Convert back to trail	Existing FS Trail
NR 23	2475	0	0.469	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	Road may not be needed if access across pvt land in Sec 34, T7N, R3E is obtained
NR 24	1605	0	0.304	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 25	1309	0	0.248	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	Road may not be needed if access across pvt land in Sec 34, T7N, R3E is obtained
NR 26	1643	0	0.311	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Barrier posts or slash at MP 0.250 (FS Boundary)
NR 27	1293	0	0.245	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Barrier posts or slash at MP 0.017 (FS Boundary)
NR 28	4021	0	0.762	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Slash at MP 0.725 (FS Boundary)
NR 29	1436	0	0.272	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Slash at MP 0.240 (FS Boundary)
NR 30	2140	0	0.405	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Slash at MP 0.32 (FS Boundary)
NR 31	597	0	0.113	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Slash at MP 0.09 (FS Boundary)
NR 32	830	0	0.157	12	Aggregate	C	Log Truck	Temporary	Barrier posts or slash	
NR 33	575	0	0.109	12	Aggregate	C	Log Truck	Long Term	Unvacated County Road, Coordinate with County	
NR 34	586	0	0.111	12	Aggregate	C	Log Truck	Long Term	Gate and barrier posts at MP 0.03 (already present)	Provides access to WL opening
NR 35	639	0	0.130	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Barrier posts or slash at MP 0.092 (FS Boundary)
NR 36	5738	0	1.087	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Barrier posts or slash at MP 0.46 (FS Boundary)
NR 37	742	0	0.141	12	Aggregate	C	Log Truck	Temporary	To be determined with input from pvt landowner	Barrier posts, slash, or gate at MP 0.125 (FS Boundary)
	61087	Total New Road Construction (ft)								
	11.570	Total New Road Construction (mi)			* = Excludes additional width needed for curve widening, turnouts, turnarounds, and radii					

Table 8: Road Reconstruction Summary

Project Road Number	Existing FS Road Number	Beginning Milepost (miles)	Ending Milepost (miles)	Minimum Surface Width (ft)*	Recommended Surface Type	Traffic Service Level	Critical Vehicle Type	Use of Road Duration	Post-Project Closure Method, if applicable	Comments
R 1	NFSR 4513.081	0	0.041	12	Aggregate	C	Log Truck	Short Term	Barrier posts or gate	Provides admin access to trail system
R 2	NFSR 4513.060	0	0.020	12	Aggregate	C	Log Truck	Short Term	Barrier posts or gate	Provides admin access to trail system
R 3	County Road	0	0.250	12	Aggregate	C	Log Truck	Long Term	Not applicable, unless directed by County	Improve to county road standard
R 4	NFSR 4513.087	0	0.044	12	Aggregate	C	Log Truck	Short Term	Barrier posts or gate	Part of trail system
R 5	Pvt Esmt Road	0	0.495	12	Aggregate	C	Log Truck	Long Term	Private Gate (existing)	Access to private land
R 6	NFSR 4647.020	0	0.452	12	Aggregate	C	Log Truck	Long Term	Barrier posts at MP 0.19	MP 0-0.19 will remain open to public use after project
R 7	NFSR 4647.040	0	1.556	12	Aggregate	C	Log Truck	Long Term	Gate at MP 0.31 (existing)	MP 0-0.31 will remain open to public use after project
R 8	NFSR 4647.042	0	0.147	12	Aggregate	C	Log Truck	Short Term	Not applicable	
R 9	NFSR 4647.043	0	0.106	12	Aggregate	C	Log Truck	Short Term	Not applicable	
R 10	NFSR 4647.044	0	0.229	12	Aggregate	C	Log Truck	Short Term	Not applicable	
R 11	NFSR 4647.010	0	0.357	12	Aggregate	C	Log Truck	Long Term	Gate (existing)	Coordinate plans with Gas Companies
R 12	NFSR 4647.080	0	0.172	12	Aggregate	C	Log Truck	Long Term	Gate or barrier posts	Provides access to WL opening
R 13	NFSR 4647.081	0	0.267	12	Aggregate	C	Log Truck	Short Term		
R 14	NFSR 4647.112	0	0.090	12	Aggregate	C	Log Truck	Short Term	Barrier posts or slash	
R 15	NFSR 4647.113	0	0.256	12	Aggregate	C	Log Truck	Long Term	Barrier posts or gate	Provides access to WL opening
R 16	NFSR 4647.111	0	0.224	12	Aggregate	C	Log Truck	Long Term	Gate or barrier posts at MP 0.04	Provides access to pond
R 17	NFSR 4647.108	0	0.073	12	Aggregate	C	Log Truck	Long Term	Gate or barrier posts	Provides access to WL opening
R 18	NFSR 4647.103	0	0.051	12	Aggregate	C	Log Truck	Short Term	Barrier posts or slash	
R 19	NFSR 4513.080	0	0.025	12	Aggregate	C	Log Truck	Long Term	Gate or barrier posts	Provides access to WL opening
			4.855	Total Reconstruction (ft)						

* = Excludes additional width needed for curve widening, turnouts, turnarounds, and radii

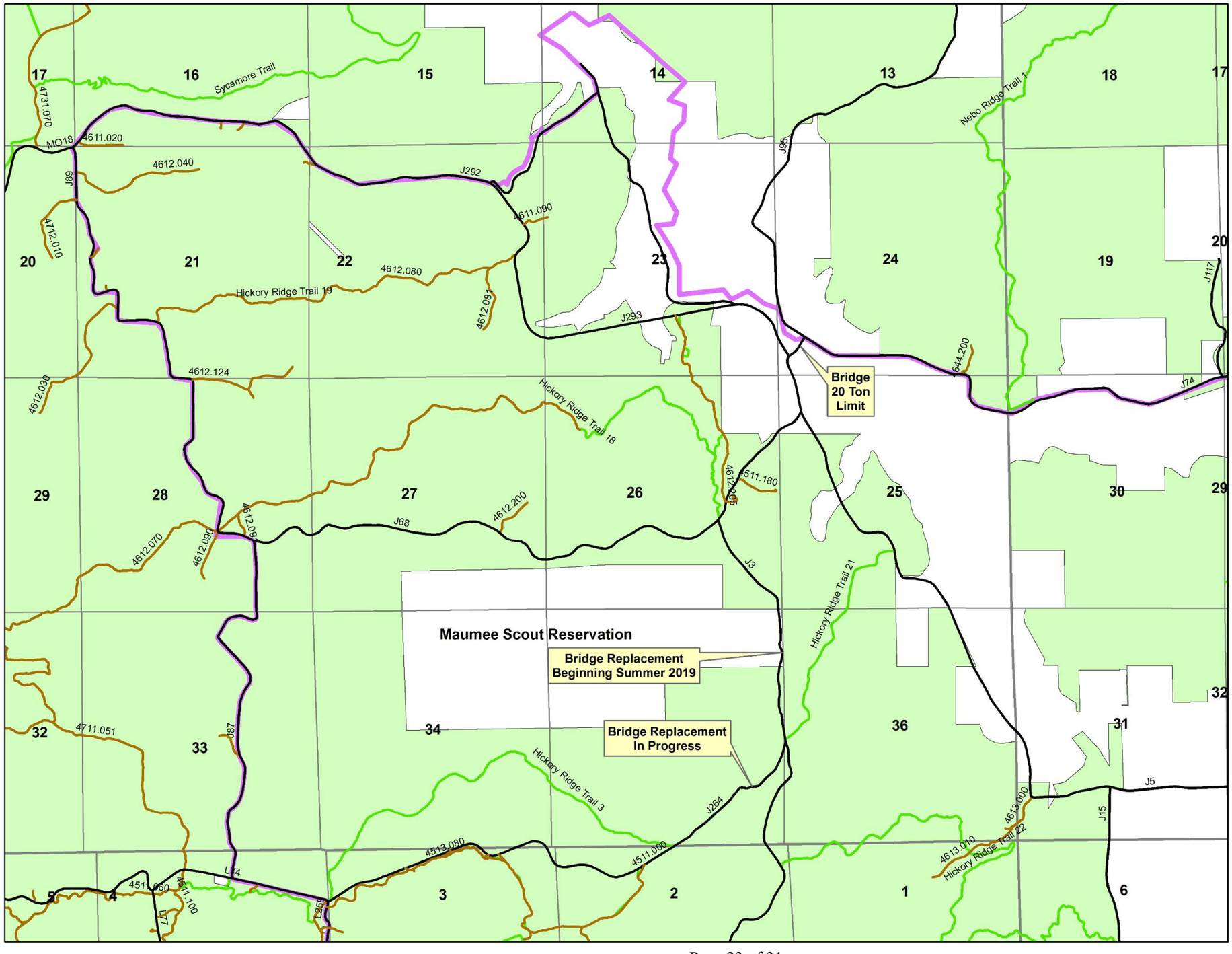
Table 9: Road Decommissioning

Decom Road #	FS Road #	Existing Length (mi)	Decommission Length (mi)	Section Being Decommissioned	Method of Decommissioning
Decom 1	4511.140	0.103	0.103	Entire length	Barrier posts near County Road
Decom 2	4513.080	1.952	0.901	Co Rd L259 to FS Road 4513.085	Convert to trail only, no on the ground work planned
Decom 3	4513.087	0.607	0.458	Between MP 0.105 and 0.563	Convert to trail only, no on the ground work planned
Decom 4	4613.000	0.200	0.035	West of FS Road 4613.010	No on the ground work planned, barriered at County Road
Decom 5	4613.010	0.424	0.145	Southwestern end	No on the ground work planned, barriered at County Road
Decom 6	4613.140	0.064	0.014	Co Rd J3 to NR 14	Barrier posts or brush in at both ends
Decom 7	4647.080	0.495	0.32	Between MP 0.035-0.355	No on the ground work planned, primarily in WL opening
Decom 8	4647.081	0.388	0.12	Eastern end	Barrier posts or brush in
Decom 9	4647.051	0.111	0.111	Entire length	No on the ground work planned, stream crossing blocks access
Decom 10	4647.050	0.246	0.204	In and north of drainage	No on the ground work planned, stream crossing blocks access
Decom 11	4647.112	0.117	0.026	Southern end	Brush in
Decom 12	4647.108	0.094	0.021	Western end	Brush in
Decom 13	4647.102	0.126	0.106	Western end	Barrier posts or brush in
Decom 14	4513.070	0.103	0.103	Entire length	Barrier posts or brush in (crosses private land)
Decom 15	4647.010	0.387	0.03	Northern end	No on the ground work planned, located in transmission line easement
			2.70	**Total Decomissioning Miles**	

ATTACHMENT 4

Existing Transportation System – Houston South Project Area

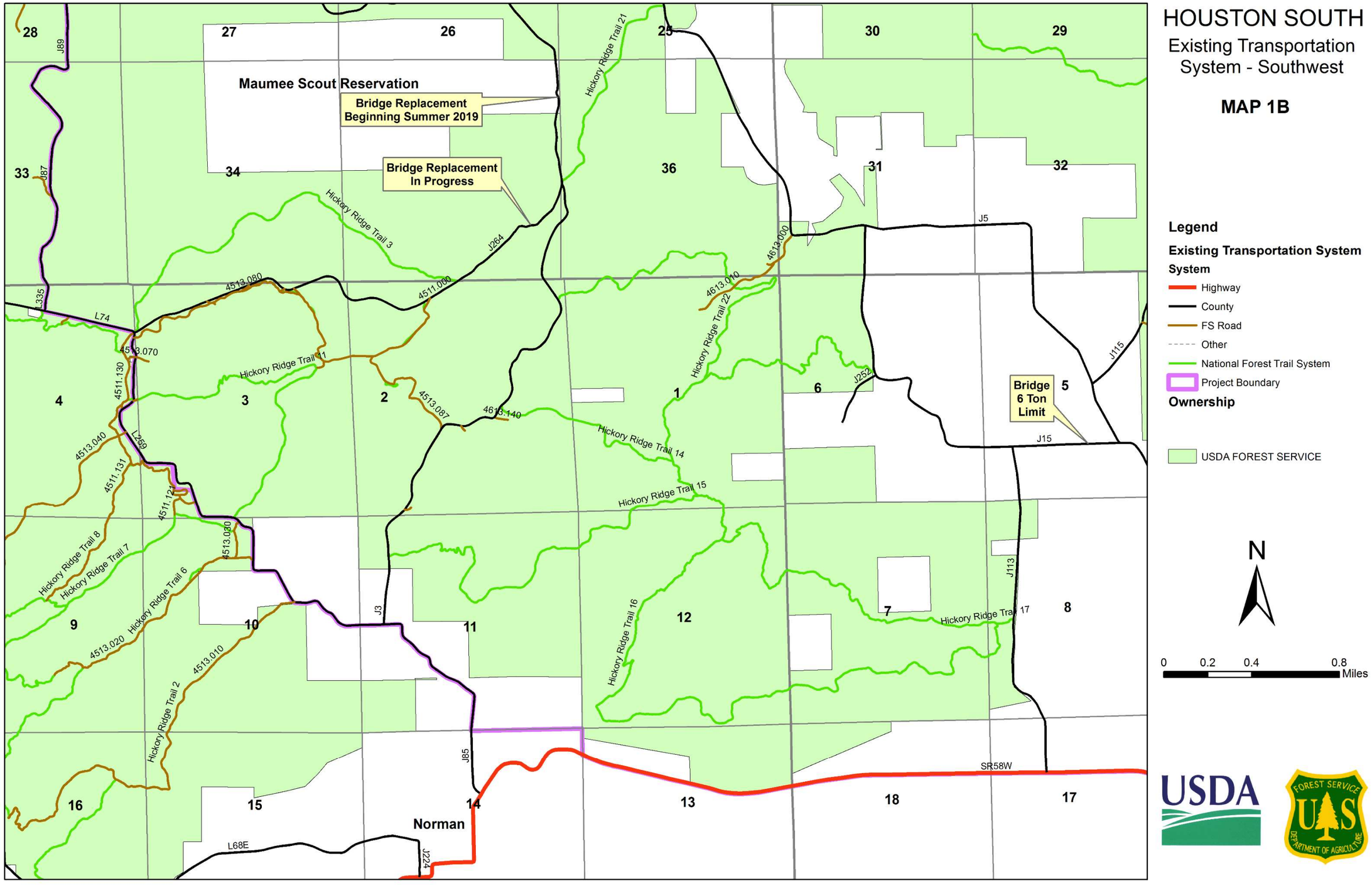
- Map 1A – Northwest Area
- Map 1B – Southwest Area
- Map 1C – Northeast Area
- Map 1D – Southeast Area



HOUSTON SOUTH

Existing Transportation System - Northwest

MAP 1A



HOUSTON SOUTH

Existing Transportation System - Southwest

MAP 1B

Legend

Existing Transportation System

System

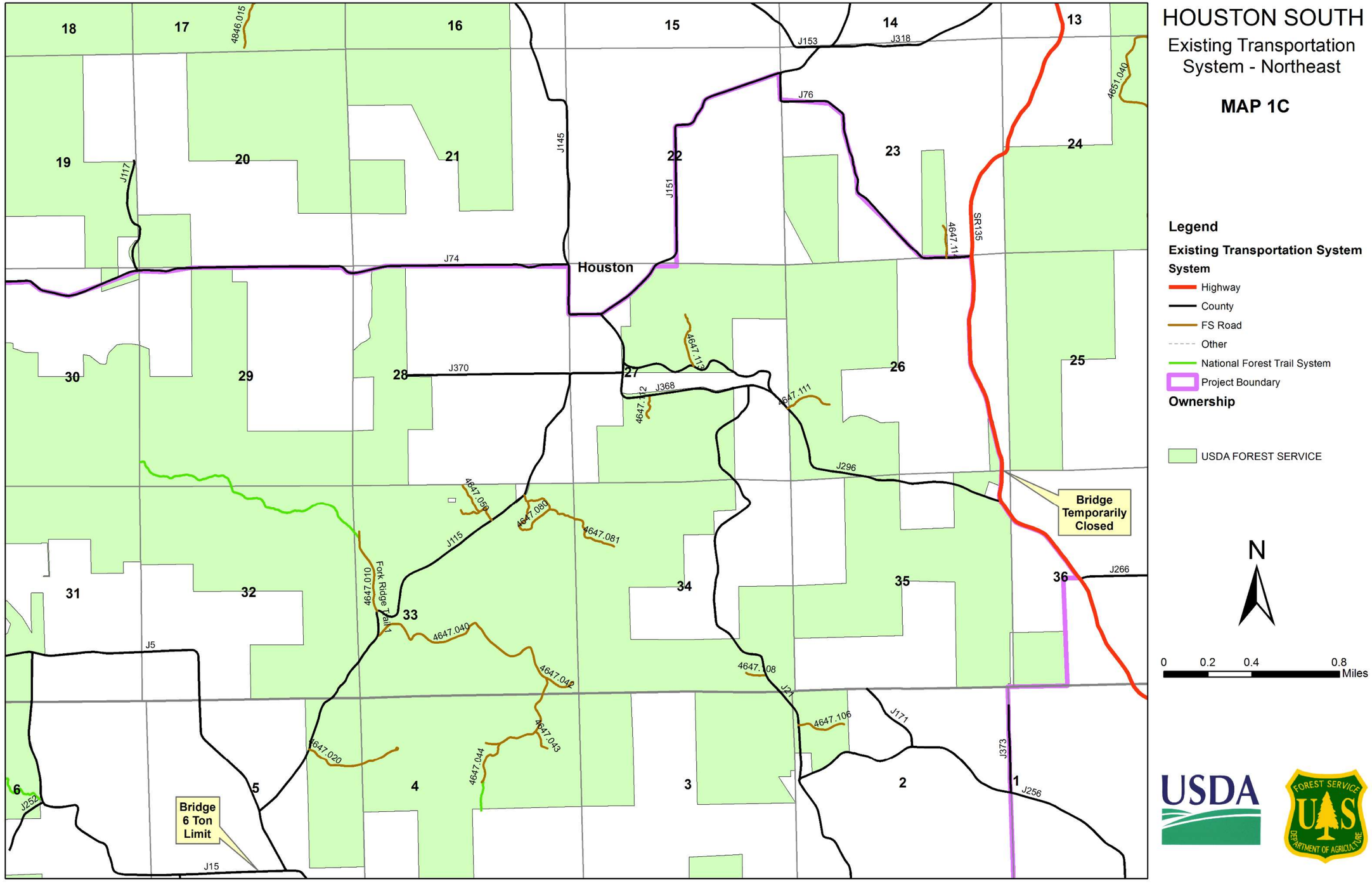
- Highway
- County
- FS Road
- Other
- National Forest Trail System
- Project Boundary

Ownership

- USDA FOREST SERVICE

N

0 0.2 0.4 0.8 Miles



HOUSTON SOUTH

Existing Transportation System - Northeast

MAP 1C

Legend

Existing Transportation System

System

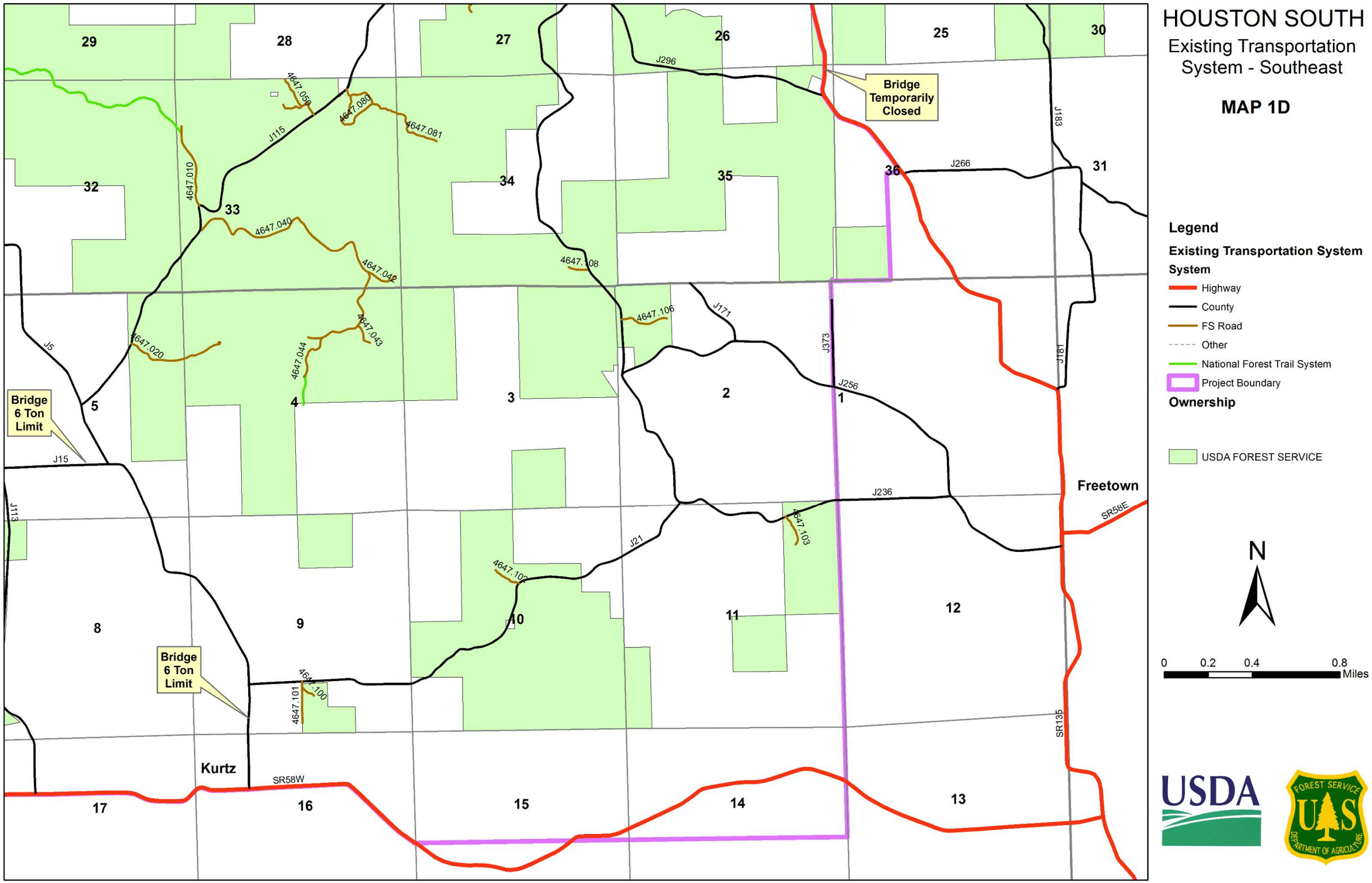
- Highway
- County
- FS Road
- Other
- National Forest Trail System
- Project Boundary

Ownership

- USDA FOREST SERVICE

N

0 0.2 0.4 0.8 Miles



HOUSTON SOUTH

Existing Transportation System - Southeast

MAP 1D

Legend

Existing Transportation System

System

- Highway
- County
- FS Road
- Other
- National Forest Trail System
- Project Boundary

Ownership

- USDA FOREST SERVICE

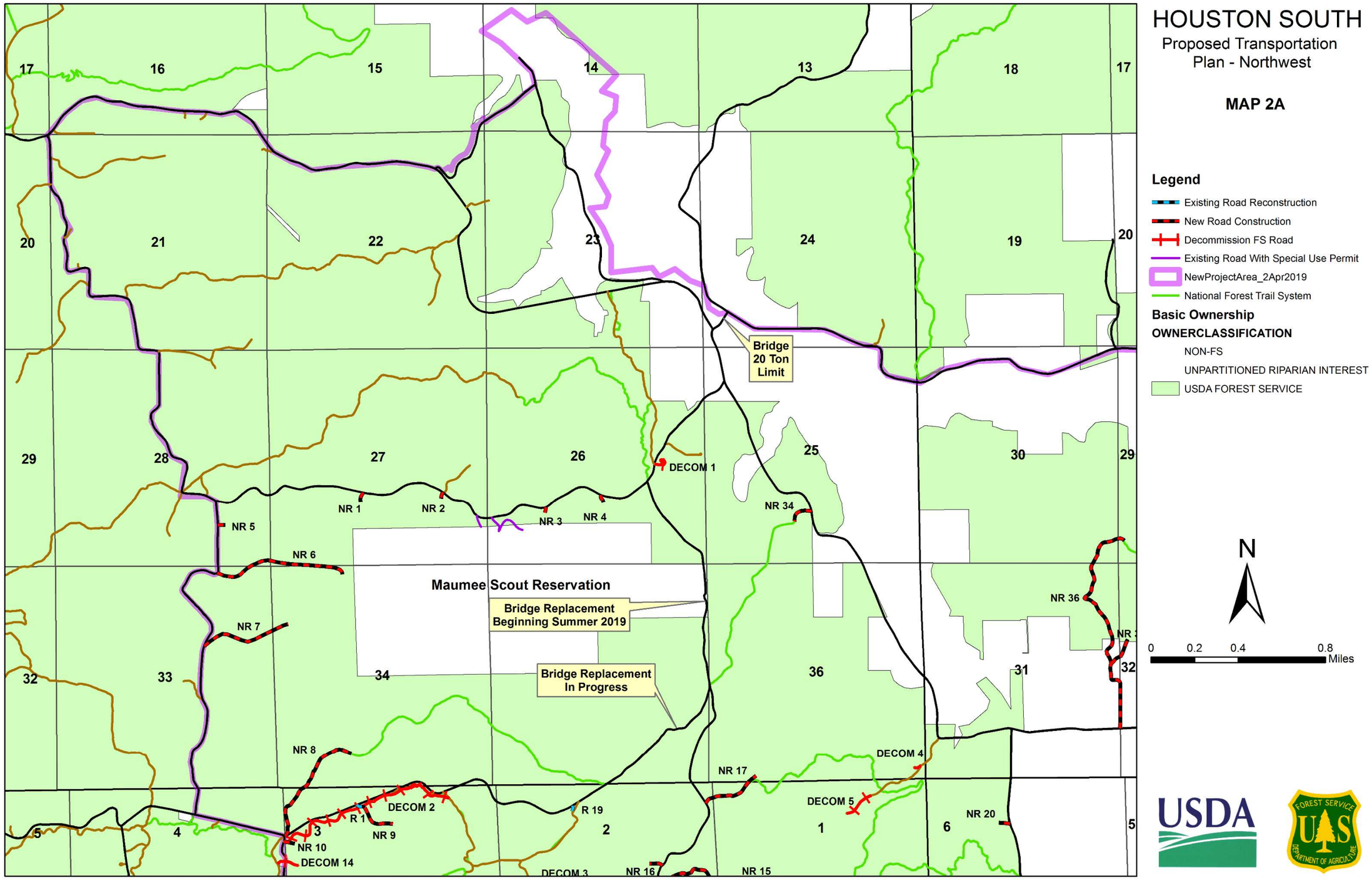
N

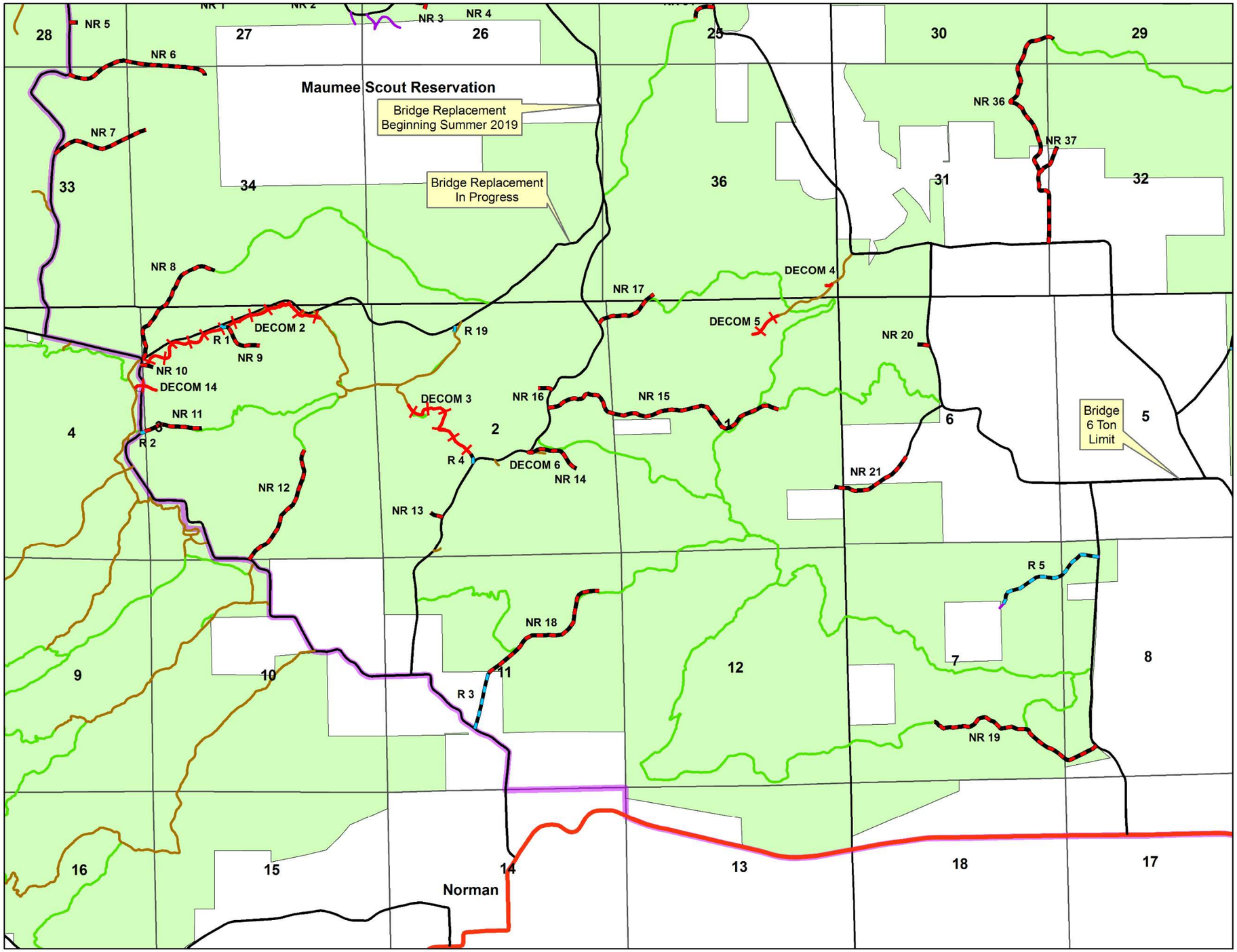
0 0.2 0.4 0.8 Miles

ATTACHMENT 5

Proposed Transportation Plan – Houston South Project Area

- Map 2A – Northwest Area
- Map 2B – Southwest Area
- Map 2C – Northeast Area
- Map 2D – Southeast Area


HOUSTON SOUTH
Proposed Transportation Plan - Northwest
MAP 2A
Legend
Existing Road Reconstruction
New Road Construction
Decommission FS Road
Existing Road With Special Use Permit
NewProjectArea_2Apr2019
National Forest Trail System
Basic Ownership
OWNERCLASSIFICATION
NON-FS
UNPARTITIONED RIPARIAN INTEREST
USDA FOREST SERVICE
Bridge 20 Ton Limit
Maumee Scout Reservation
Bridge Replacement Beginning Summer 2019
Bridge Replacement In Progress
DECOM 1
DECOM 2
DECOM 3
DECOM 4
DECOM 5
DECOM 14
NR 1
NR 2
NR 3
NR 4
NR 5
NR 6
NR 7
NR 8
NR 9
NR 10
NR 15
NR 16
NR 17
NR 20
NR 34
NR 36
R 1
R 19
N
0 0.2 0.4 0.8 Miles
USDA
FOREST SERVICE
DEPARTMENT OF AGRICULTURE



HOUSTON SOUTH

Proposed Transportation Plan - Southwest

MAP 2B

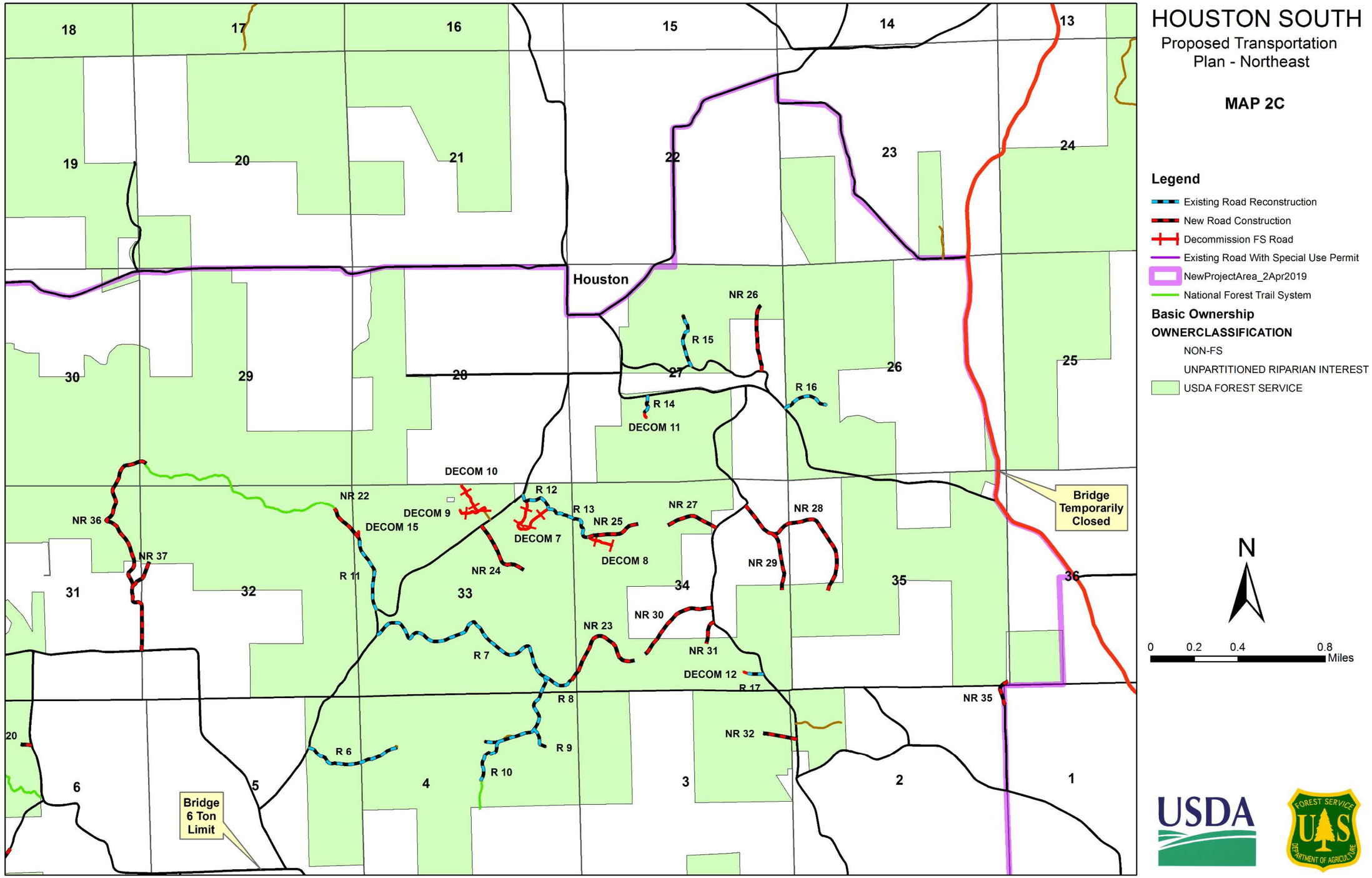
Legend

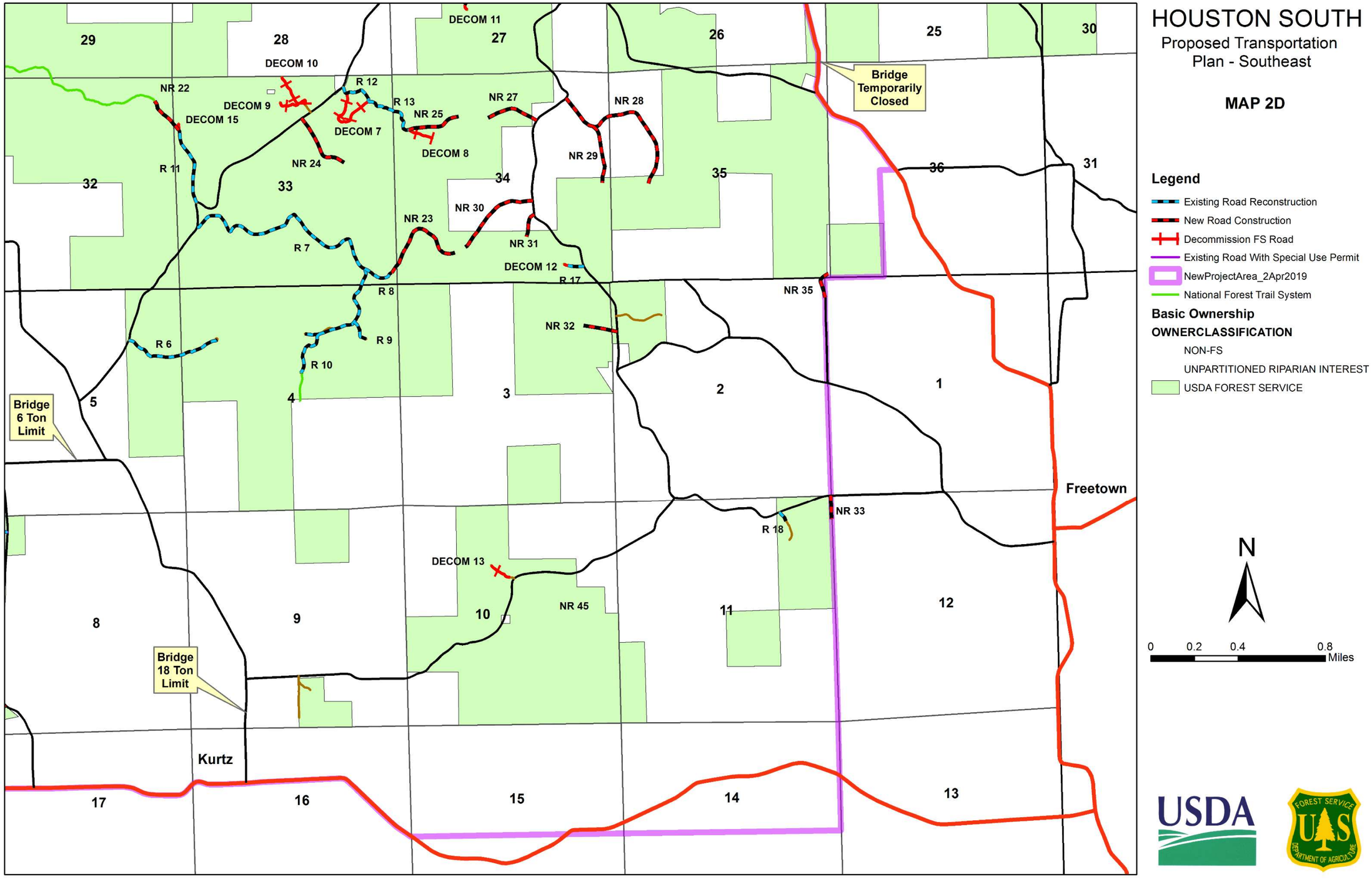
- Existing Road Reconstruction
- New Road Construction
- Decommission FS Road
- Existing Road With Special Use Permit
- NewProjectArea_2Apr2019
- National Forest Trail System
- S_USA.Wilderness

Basic Ownership

OWNERCLASSIFICATION

- NON-FS
- UNPARTITIONED RIPARIAN INTEREST
- USDA FOREST SERVICE


HOUSTON SOUTH
Proposed Transportation Plan - Northeast
MAP 2C
Legend
Existing Road Reconstruction
New Road Construction
Decommission FS Road
Existing Road With Special Use Permit
NewProjectArea_2Apr2019
National Forest Trail System
Basic Ownership
OWNERCLASSIFICATION
NON-FS
UNPARTITIONED RIPARIAN INTEREST
USDA FOREST SERVICE
Houston
NR 26
R 15
R 16
R 14
DECOM 11
DECOM 10
DECOM 9
DECOM 15
DECOM 7
R 12
R 13
NR 25
DECOM 8
NR 27
NR 28
NR 29
NR 22
NR 24
R 11
NR 36
NR 37
NR 30
NR 31
NR 23
R 7
R 8
R 9
R 10
R 6
DECOM 12
R 17
NR 32
NR 35
Bridge Temporarily Closed
Bridge 6 Ton Limit
N
0 0.2 0.4 0.8
Miles
USDA
FOREST SERVICE
DEPARTMENT OF AGRICULTURE



HOUSTON SOUTH

Proposed Transportation Plan - Southeast

MAP 2D

Legend

- Existing Road Reconstruction
- New Road Construction
- Decommission FS Road
- Existing Road With Special Use Permit
- NewProjectArea_2Apr2019
- National Forest Trail System

Basic Ownership

OWNERCLASSIFICATION

- NON-FS
- UNPARTITIONED RIPARIAN INTEREST
- USDA FOREST SERVICE

N

0 0.2 0.4 0.8 Miles